ENMOS

SIMPLICITY SMART

Simplex 2XX Series
USER'S MANUAL

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Simplex 210,220,230 Specifications

Simplex		210	220	230
Commands				
Temperature Control	*Fast or Gradient Heating and Cooling*	•	•	•
Dosage	*Progressive proportional dosage*	-	•	•
Wait	*Waiting along with the entered period*	•	•	•
Warning	*Operator calling*	•	•	•
Fill Water	*Tank Fill Water*	•	•	•
Drain	*Tank Drain*	•	•	•
Transfer	*Transfer between Tanks*	-	-	•
Overflow	*Main Tank Overflow*	-	•	•
Special Command	*Commands special to machine*	3	3	3
Input/Output				
Analogue Input	*Pt100 (-200 / 800 ˚C)* *0/4 – 20 mA (input resistance 110 ohm*	1 -	1 2	2 2
Analogue Output	*0/4 – 20 mA (load resistance max. 250 ohm)*	1	2	4
Digital Input	*5 – 24 V DC/AC*	4	8	16
Counter Input	*5-24 V DC/AC 1 KHz*	-	-	1
Digital Output	*250 V AC 1 A Relay NA*	8	12	16
Communication Port	*RS 485*	•	•	•
Programming				
Program capacity		64	64	64
Program Max. Step Number		50	50	50
Main Command		1	1	1
Parallel Command		1	1	1
Sequential Program		3	3	3

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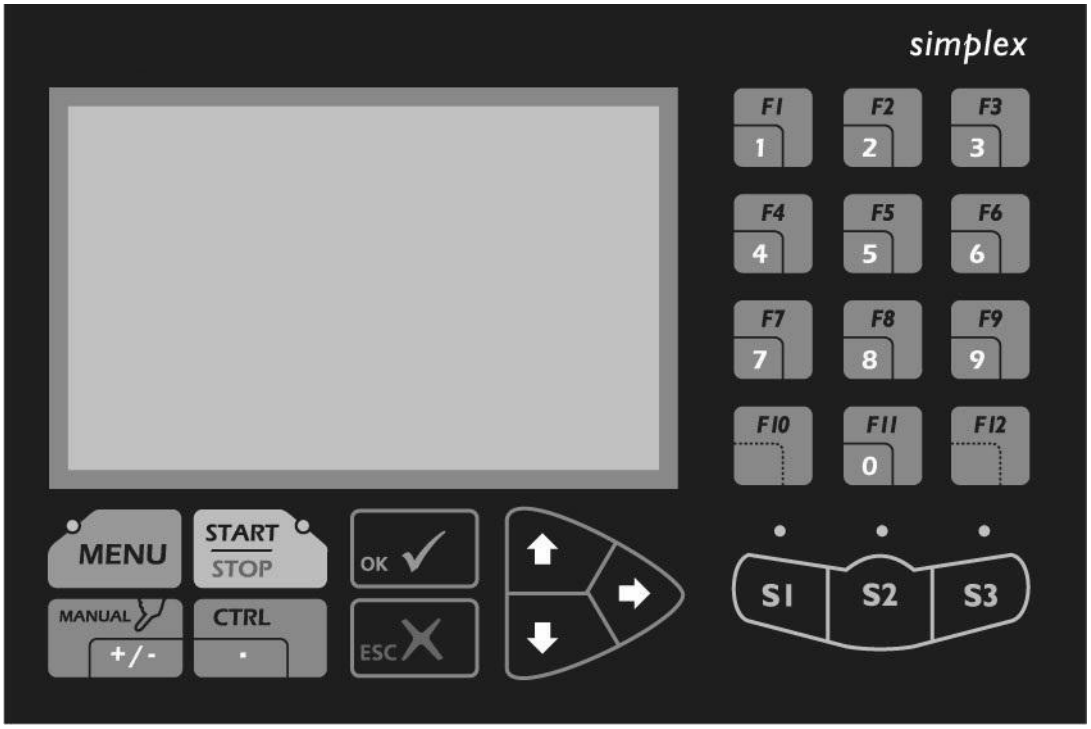
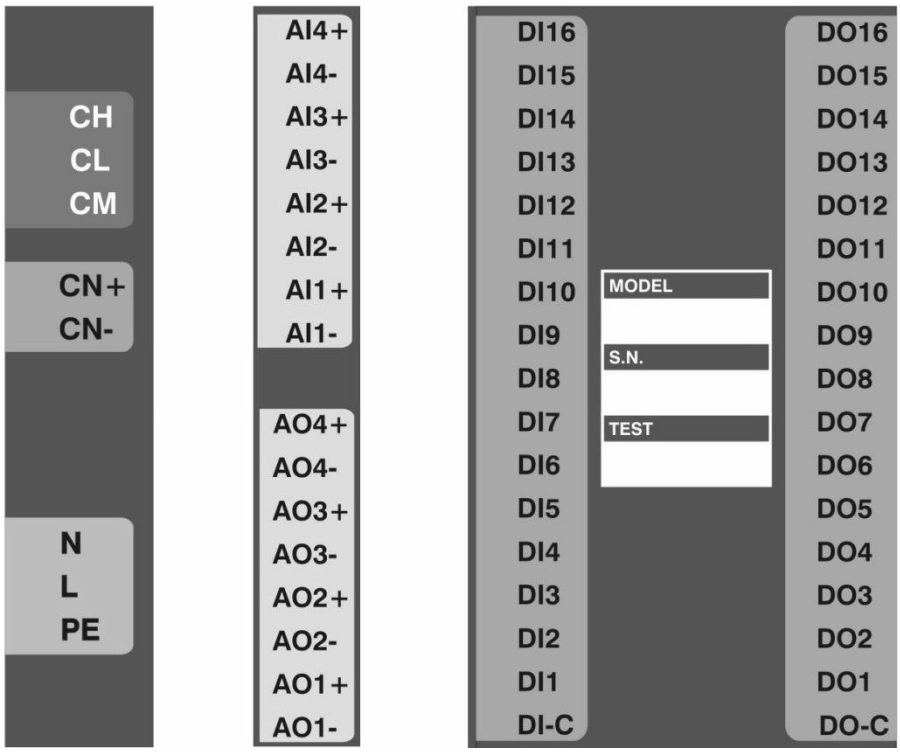
Front Panel Appearance



Rear Panel Appearance



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Keypad Usage

	Use this button to enter the menu. You may move through the menu by using the RIGHT Cursor Button.
	Use this button to start a program, pause a running program or to resume it.
	Use this button to manually control program steps.
	Use this button to move on to other options of the current program step by pressing CTRL+BUTTON. And you may also use this button to enter decimal values.
	Use this button to confirm the current selection, recent changes, approve alarms etc.
	Use this button to go back to the previous menu without confirming the changes you made.
	Use this button to move right on menu screen.
	Use this button to move up and down on menu screen.
	F1-F12 function keys are used to enter digital values and to run manual functions on manual screen.
	S1 key is used to delete entered values (like backspace key). On manual screen S1-S2-S3 keys are used to run manual functions.

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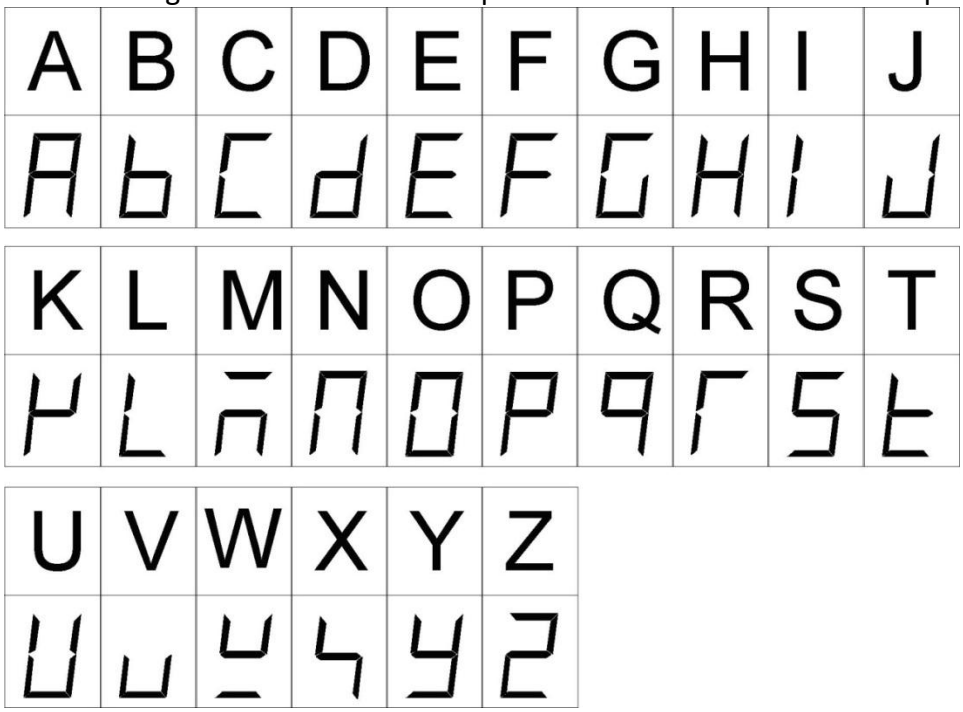
Abbreviations

Abbreviation	Explanation
SP	Set Point
PV	Process Value
ALR	Alarm
Tol	Tolerance
Invr	Inverter
LEVL	Level
T.OUT	Time Out
OPRT	Operator
SFT	Software
PASS	Password
HGH	HIGH
N	New
E	Edit
D	Delete

Letter Correspondence

The following table shows the correspondence between letters and display symbols.



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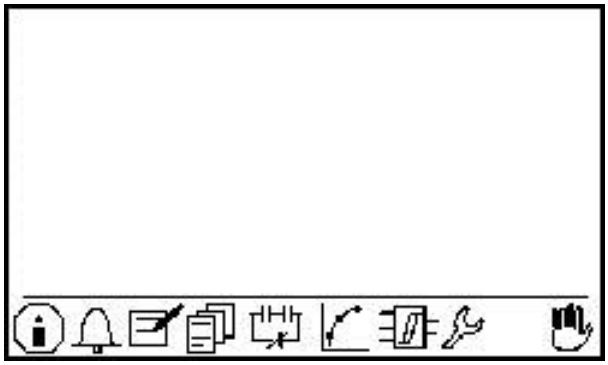
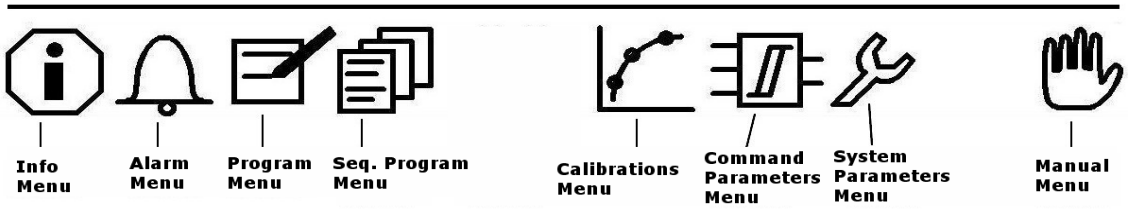
Menu Screen



Press Menu button to enter. Navigate through the options by pressing RIGHT Cursor Button. Press OK button, to select the option to be entered. Press ESC button to exit the menu.

Menu Instructions

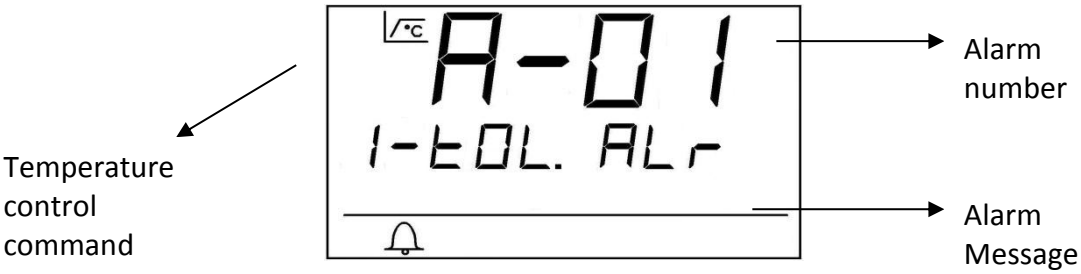


Information Screen

If Program is running:
The number, the duration and the step of the running program is displayed. You may move among this information by using the RIGHT Cursor Button. You may also change certain batch parameters (inverter value or rotate duration) through this menu.
If Program is not running:
The firmware version information is displayed.

Alarm Menu

Select alarm icon " " on main menu and press OK button. You may see all existing alarms with this menu. First 10 alarms will be listed sequentially. All alarms and related detailed information are given below. You may see the alarm number on the top of the display and the content of the alarm on the bottom of the display. If the alarm number is blinking, this means alarm is not approved. You may press the OK button to approve this alarm.



Alarm Message	Alarm Reason
NO ALR	NO Alarm
TOL. ALR	Tolerance alarm occurs when temperature exceeds or falls beyond tolerance values (see command parameters) Check up the Program, PID parameters and command parameters.
T.OUT ALR	Time out alarm occurs when the targeted temperature can not be achieved within the preset time. Check up the Mechanical parts and PID parameters.
OPRT ALR.	Call Operator
LEVL ALR.	Level alarm occurs if the dosing tank is empty when the dosing command takes control.
EE R ALR	This alarm occurs when data can not be read from the memory module in the device. Contact the Technical Service.
EE V ALR	This alarm occurs, when data can not be saved to the memory module in the device. Contact with the Technical Service.
PRG.END	This alarm occurs when the program ends. You may turn back to the main menu by pressing OK or ESC button.
L. VOLT ALR	Low voltage alarm occurs if the source voltage is lower than 170 V or if the oscillation in electric system is abnormal.
HIGH T. ALR	High temperature alarm. Stop Program. Turn off heating switch.
SFT. ALR	Software parameter error alarm. Contact with the Technical Service.
PT100 AL	PT100 sensor alarm. Stop the program. Set the heating switch off. Check up the sensor.
mA AL	Level sensor alarm. Check up the sensor.
PPL ALR	Alarms related to control loops.
INVR ALR	Inverter alarm. Stop the program. Check up the inverter.

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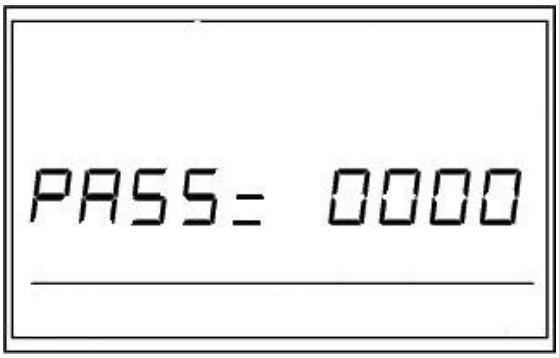
Password Menu

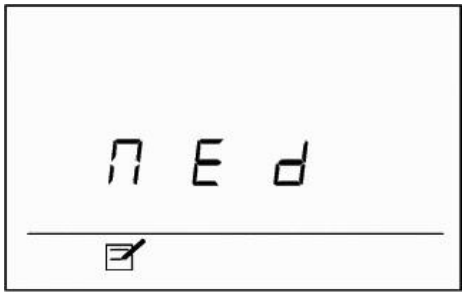


Password query is presented when the security related menus are called. You may navigate through the steps by using the RIGHT Cursor Button. The values of the steps may be changed by using UP and DOWN Cursor Buttons. After typing your password, press OK button. If the password is correct, you will be allowed to enter the menu. Unless the password is correct, you will see a error message and you will be asked to type the password again

Forgotten Password

If the password is forgotten, press the Manual button on password menu. Encrypted form of the passwords registered in that device will be displayed. You may achieve the forgotten password by sending the encrypted string to Enmos Technical Service.

Program



You may enter the program menu by pressing select icon and press OK. You may write, edit or delete program operations here. 64 different programs can be written. A program can not exceed 50 steps.

Using the Keypad for Program Editing

UP AND DOWN CURSOR BUTTONS	It is used to navigate through the steps.
S3	It is used to delete steps.
S2	It is used to add steps.
S1	It is used to change the command in the existing step.
ESC	It is used to exit the program. (When the Y/N question is asked, select Y to save, select N to exit without changing.)
OK	It is used to exit the program. (When the Y/N question is asked, select Y to save, select N to exit without changing.)
MANUAL	It is used to select the PID region for the command controlling temperature.
MENU	It is used to add the operator alarm when the step is over. If the red led on the menu button is on, operator alarm is added. If the led is off, no alarm is added. Press MENU button again to remove existing operator alarm.
RIGHT CURSOR BUTTON	It is used to add a parallel command to the main step.

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Command List

No	Function Key	Name	Instruction
1	F1	Temperature Control	Main tank temperature control
2	F2	Dosage	Dosage from additional tank to main tank
3	F3	Wait	Waiting during determined duration
4	F4	MT Fill Water Proportionally	Main tank Fill Water Proportionally
5	F5	MT Drain	Main tank drain
6	F6	MT Overflow	Main tank overflows
7	F7	MT → Additional tank Transfer	Transfer from main tank to additional tank
8	F8	Additional tank Fill Water	Additional tank Fill Water
9	F9	Additional tank Drain	Additional tank Drain
10	F10	Additional tank Heat	Additional tank Heat
11	F11	AT Circulation	Circulation between Main Tank and Additional Tank
12	F12	Operator Call	Operator Call Command
13	S1	Command 13	Time based command
14	S2	Command 14	Time based command
15	S3	Command 15	Time based command

Write a New Program

1. Press MENU.
2. Choose the program icon and press OK.
3. Choose **N** on the **N** E D (**N = New Program**, E = Edit Program, D = Delete Program) menu displayed on the screen.
4. The first available program number will automatically be displayed. Use arrow buttons to change the program number. Then press OK.
5. After selecting step number, press OK.
6. Using F1..S3 buttons, select the desired command and press OK button.

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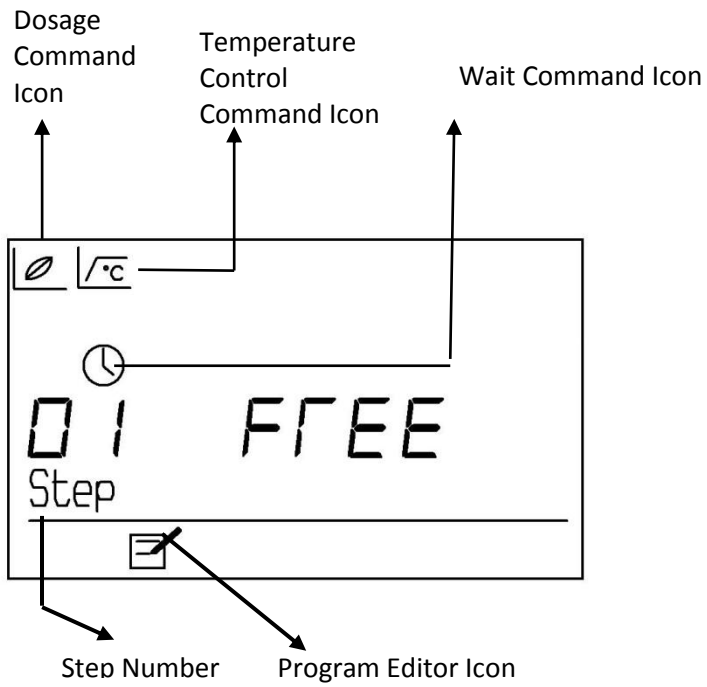
Illustration of Command Select Menu



Adding Command

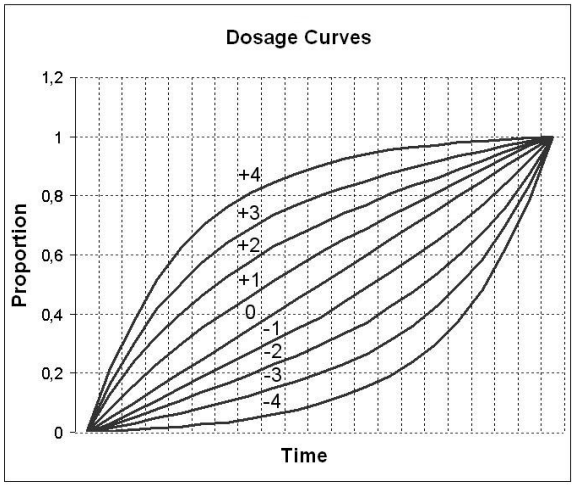
F1-- Temperature Control Command

- Enter temperature value using numeric keypad. Then press OK.
- Use arrow cursor buttons to enter the amount of time (in minutes) to arrive at the given temperature value. Then press OK.
- Use arrow cursor buttons to enter the waiting time (in minutes) after target temperature is reached. Then press OK.

F2 -- Dosage Command

- Use numeric keypad to enter the dosing ratio (in percents). Then press OK.
- Enter dosing duration and press OK. (Enter 0 for fast dosing, i.e., fastest possible transfer of the liquid)
- Select the desired progression/regression curve and press OK.

Dosage Curves



F3 -- Wait Command

- Use numeric keypad to enter the waiting time (in minutes). Then press OK.

F4 – Main Tank Proportional Fill Water Command

- If you set a value total liter will calculate with this formula. **Liter = Ratio (The value that you entered to this command) x Kilo (You will enter while batch starting).**
- If you set zero "0" total liter will calculate with this formula. **Liter = Ratio (You will enter while batch starting) x Kilo (You will enter while batch starting)**
- Select water type, by using up and down cursor buttons and press OK button.

F5 – Main Tank Drain Command

- This works until the quantity of water in main tank is seen at 0 level.

F6 – Main Tank Overflow Command

- Enter the desired duration (in minutes) and press OK button for overflow command.
- Select water type, by using up and down cursor buttons and press OK button.

F7 – Main Tank Additional Tank Transfer Command

- Enter the desired quantity of water to be transferred to the additional tank and press OK button.

F8 – Additional Tank Fill Water Command

- Enter the desired quantity of water to be filled to the additional tank and press OK button.

F9 – Additional Tank Drain Command

- This works until the quantity of water in main tank is seen at 0 level.

F10 – Additional Tank Heat

- This works until the value of temperature in additional tank is seen at desired temperature value.

F11 – Additional Tank Circulation

- Enter the desired duration (in minutes) and press OK button for circulation command.

F12 – Operator Command

- Select which message will show while this command executes then press OK.
- The Alarm output will open while message on screen.

F13~F15 - Special Commands 1~3

- Special command, that works time based. This command makes "wait" process along the determined duration.
- Enter the desired duration (in minutes) and press OK button.

If a warning is desired after the added command ends, press MENU button while entering the command parameters or moving on to the step.

The next step is automatically displayed after the parameters are set for the current step. It is possible to use down arrow to view the added command. Move on to the last step that is set and press OK button to add another command.

Adding Parallel Command

- Select the step in which you want to add a parallel command, by using cursor buttons.
- Press the RIGHT Cursor Button.
- Select the parallel command to be added from the command select menu by using the RIGHT Cursor Button and press OK button.

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- Enter the certain values of the selected command by using Cursor Buttons and OK button.
- After entering all parameters of the command, the selected command is added to the main step parallel.
- There will be a “P” by the number of the main step

Changing Parallel Command

- Select the step, on which the parallel command to be changed, is written, by using Cursor Buttons.
- Press RIGHT Cursor Button.
- The previous entered values will be displayed.
- Change the necessary values by using the Cursor Buttons and OK button.

Edit a Program

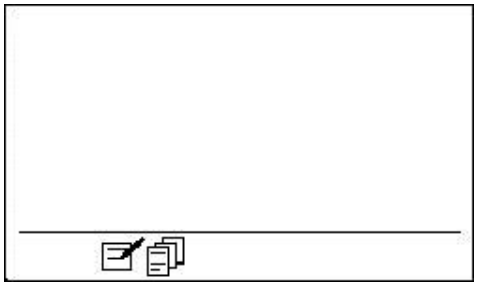
1. Press MENU.
2. Choose the program icon and press OK.
3. Choose **E** on the N **E** D (N = New Program, **E = Edit Program**, D = Delete Program) menu displayed on the screen.
4. Use arrow buttons to select the program number. Then press OK.
5. Use arrow buttons to select the program step to be edited.
6. Use arrow buttons and OK button to change parameter values of the step.

When you finished the program editing Press ESC Key. When the Y/N question is asked, select Y to save, select N to exit without changing

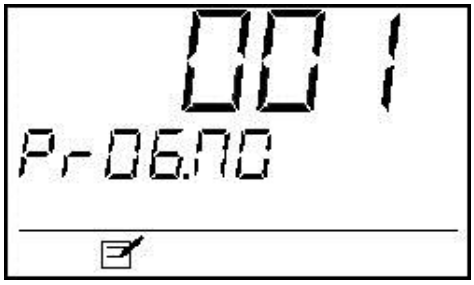
Delete a Program

1. Press MENU.
2. Choose the program icon and press OK.
3. Choose **D** on the N E **D** (N = New Program, E = Edit Program, **D = Delete Program**) menu displayed on the screen.
4. Use arrow buttons to select the program number. Then press OK.
5. Select Y to answer the question "Delete Y/N". Then press OK.
6. Press OK again when "DELETED" message appears on the screen.

Running and Monitoring a Program



To run a program, move to the main screen. Pressing Start/Stop button, enter the screen shown at right. Select program icon and press OK button.



Enter the number of program that you want to start. And press OK button.

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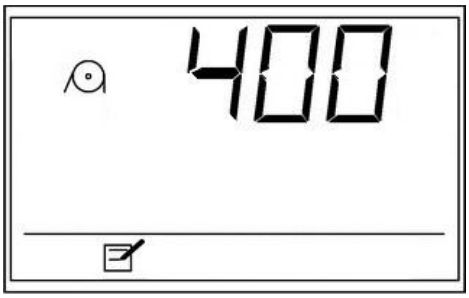
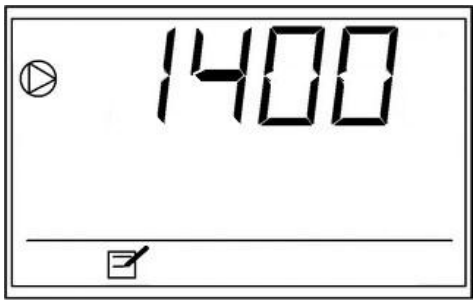
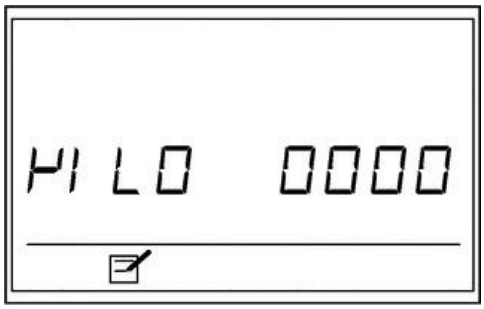


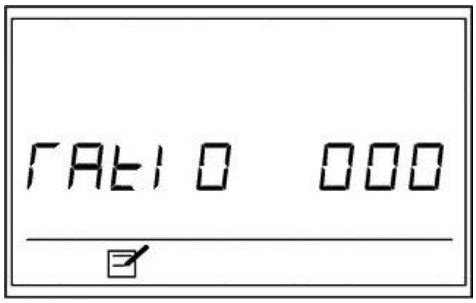
Enter Reel speed. Press OK button .



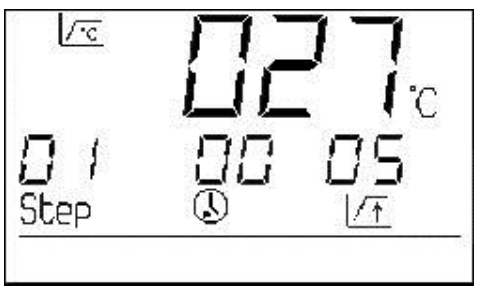
Enter pump speed. Press OK button.



Enter Kilo



Enter Ratio



Press OK button for start the program.

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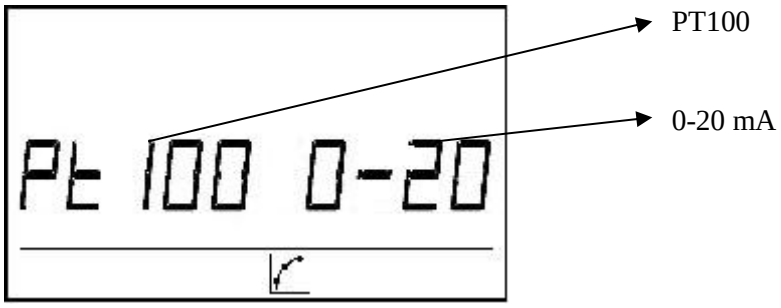
Using Keypad While Program is Running

Up and Down Cursor Buttons	Use this button to navigate through the steps while the program is running.
CTRL	This button is used to display the instant value of heat control (the value that must exist in ramping heating) during the heat control step. If CTRL Button is pressed, the waiting duration is displayed.
RIGHT CURSOR BUTTON	Use this button, while a step is running, to enter the SP screen that step. You turn back to the running step after 5 sec automatically.
OK	This button is used to run the selected step if the step is selected by using cursor button and Ok Button is pressed.
MANUAL	This button is used to enter the Manual IO watching display/screen.
START_STOP	This button is used to stop if the step is running, continue where it is paused if pressed again.
ESC	If the program is already stopped or ended it asks for canceling. (To cancel the program selects Y, to turn back to watching display/screen, select N, when Y/N question is asked.)

****Factory value***

Calibration

Enter the calibration menu by selecting icon. Move on to the I/O type to be calibrated by using the Cursor Buttons and select by using OK Button.



PT100 :

The resistance of the cable which connects the device and sensor may cause negligible differences for the displayed value. You may change the line resistance parameter, by selecting PT100 to get the correct value.

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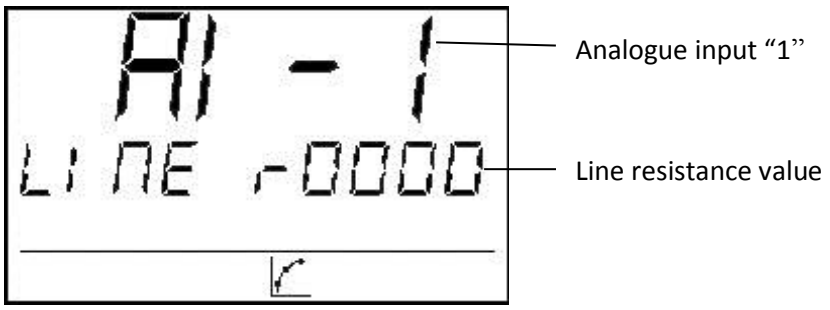
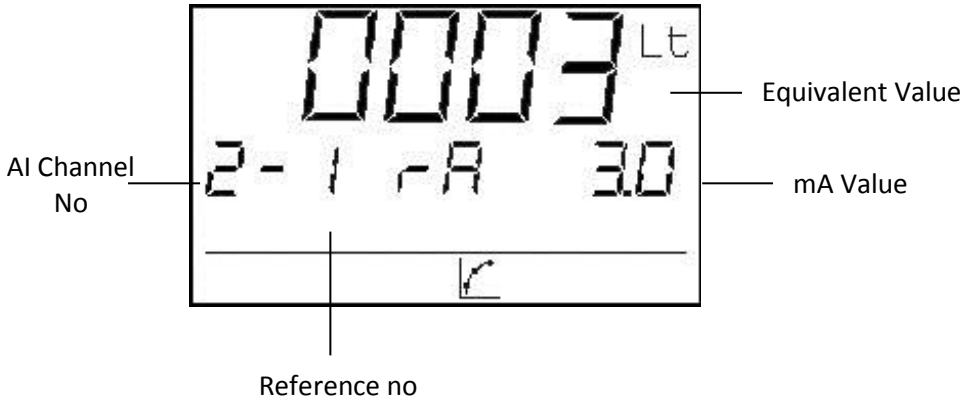
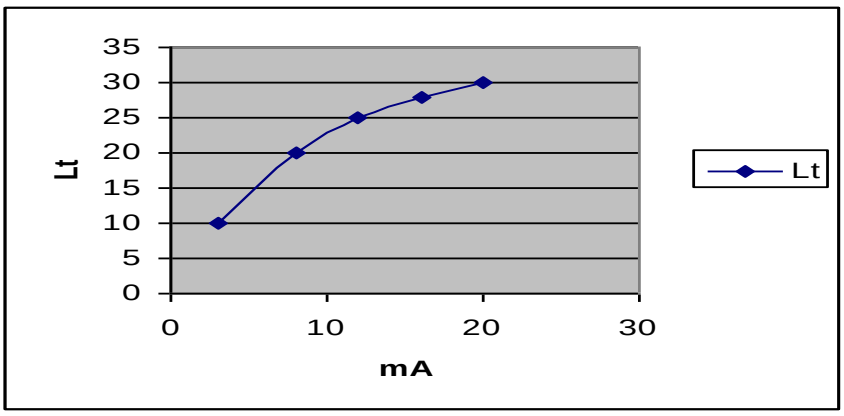


X-20 mA



0-20 mA calibration illustration shown above. You may enter 5 different calibration points. While the reference number blinks, you may select any of them by using UP-DOWN Cursor Buttons and press OK Button. Enter the equivalent Lt value of mA value that is read from the AI port. Go to the next step by pressing OK Button. You may enter the mA value by pressing Manual Button. When the calibration operation is completed, exit by pressing ESC Button. Select Y, to save or select H to exit without saving.



Parameters

Command Parameters (v 01.9)

No	Instruction	F. V.*	Max. V.
1	Temperature control alarm tolerance (°C)	50**	50**
2	Temperature Control On Delay for start the control (sec)	20	300
3	Automatic cooling support. When the temperature exceeds the target of control. It determines the waiting duration before the cooling. (sec) **0→** No automatic cooling. **XX→** Starting duration of cooling.	30	300
4	Automatic Cooling start tolerance (°C)	10**	200**
5	Period value of the time- proportional control for temperature control command. (sec)	10	30
6	Maximum period value of the time- proportional control for temperature control command. (sec)	10	100
7	Maximum value of the cumulative integral for the temperature control command. (%)	50	100
8	PID gain value for the temperature control command	25	100
9	PID integral value for the temperature control command.	600	1000
10	PID derivative value for the temperature control command.	0	100
11	Temperature Control Target Tolerance Value (°C)	5	50
12	Temperature Control Condense Time (sec)	10	300
13	Temperature Control Time Out Duration (min)	5	240
14	Dosage alarm tolerance (Lt)	8**	150**
15	Dosage pump on delay for start(sec)	3	60
16	Dosage off delay (sec)	10	60
17	Dosage on delay before starting to control (sec)	5	60
18	Dosage P control gain value (%)	35	100
19	Dosage Period value of the time- proportional control for the dosage command. (sec)	5	30
20	Dosage Offset value of level sensor (Lt)	3	20
21	Dosage Fill Water Duration for Rinsing (sec)	3	30
22	Dosage Time Out Alarm Duration (min)	5**	240**
23	Main tank fill water alarm tolerance value (Lt)	30**	200**
24	Main tank fill water alarm duration (min)	20	120

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25	Main tank fill water stabilization duration. Waiting duration for controlling level after reaching the target. (sec)	5	250
26	Main tank fill water target tolerance value (Lt)	0	300
27	Main tank drain alarm duration (min)	10**	120
28	Main tank drain off delay duration (sec)	60	250
29	Main tank drain target tolerance (Lt)	10	300
30	Main tank overflow high level (Lt)	1800	9999
31	Main tank overflow low level (Lt)	1200	9999
32	Main tank overflow alarm tolerance value (Lt)	0	1000
33	Main tank→ Additional tank tolerance value (Lt)	0	100
34	Main tank→ Additional tank alarm duration (min)	10	120
35	Additional tank fill water tolerance value (Lt)	0	100
36	Additional tank fill water duration (min)	10	120
37	Additional tank drain alarm duration (min)	10	120
38	Additional tank circulation command top level (Lt)	100	900
39	Additional tank circulation command middle level (Lt)	75	900
40	Additional tank circulation command tolerance level (Lt)	10	100
41	Additional tank heat command tolerance value (°C)	1	50
42	Operator Command Working Type 0→ Don't jump next step after approve 1→ Jump next step after approve	0	1

* ***Factory Values***
** ***Entered value must be set as X10. For example enter 55 for 5,5***

System Parameters (v 1.50)

No	Instructions	F.V.*	Max.V.
1	Module Number (For communication with central monitoring software.)	1	64
2	PID control type of temperature control command. **0**→ Time-proportional control (with Heating or Cooling DO) **1**→ Proportional control (with IP converter AO)	0	1
3	P control type of dosage command **0**→ Time-proportional control (with dosing Valve DO) **1**→ Proportional control (with IP converter AO)	0	1
4	Dosage pump	1	2

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	0→ No Dosage Pump **1→** Dosage pump exists		
5	Minimum main tank pump period (rpm)	0	3000
6	Maximum main tank pump period (rpm)	1400	3000
7	Minimum reel speed (meter/min)	0	500
8	Maximum reel speed (meter/min)	450	500
9	Minimum machine capacity (kg)	0	900
10	Maximum machine capacity (kg)	900	2000
11	Minimum flotte ratio	4	20
12	Maximum flotte ratio	10	20
13	Maximum machine temperature (°C)	140	800
14	Maximum heating capacity (°C /min)	10**	100**
15	Sequential Program **0→** No Sequential Program **1→** Sequential Program exists	0	1
16	Temperature show type **0→** Don't display the digit . (example 50 °C) **1→** Display after point (example 50.2 °C)	0	1
17	Temperature control minimum period of Heating or Cooling valve (sec)	0	5
18	Dosage command max. duration (min)	60	120
19	Wait Command maximum duration. (min)	60	120
20	Main tank overflow maximum working duration (min)	60	120
21	Additional tank maximum level	450	900
22	Level show type **0→** Don't display the digit. (example 48 Lt) **1→** Display after point (example 48,6 Lt)	0	1
23	Default type of "temperature control command" control type while writing a program. **0→** Time based **1→** Gradient based	0	1
24	Minimum recipe number	12***	99***
25	Maximum recipe number	15***	99***
26	Automatically turning back time to active step (sec)	5	30
27	Transition duration between commands while parallel commands are running.	10	60

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28	Main Tank Level Sensor Type 0→Digital Level Sensor (Minimum, Middle, High) 1→Analogue Level Sensor	1	1
29	Operator password	0	9999
30	Program editing password	0	9999
31	Technical service password	--	--
32	Reserved	--	--
33	It determines if the program would be saved or not when the energy is off. And it determines the working way for the "on" mode of energy. **0→** Program is not saved. **Running program does not turn back when the energy is on.** **1→** Program is saved. **Running program turns back in a waiting mode when the energy is on. Press start button to resume.** **2→** Program is saved. **Program starts to run automatically, when the energy is on. (This method is not advised because of its danger.)**	1	1
34	It determines the communication speed of the module. **0→** 9600 bps **1→** 19200 bps **2→** 38400 bps	0	2
35	Flow meter existence status. **0→** No Flow meter **1→** Flow meter exist	0	1
36	Tolerance Alarm Message Status **0→** Don't show tolerance alarm **1→** Show tolerance alarm	1	1
37	Rinsing Type of Dosage Command 0→No Rinse to Drain 1→Rinse to machine and drain	1	1
38	Multi Water Support 0→No multi water 1→Multi water exist	0	1
39	Language Choice 0→English 1→Turkish	0	1
40	Additional Tank Level Sensor Type 0→Digital Level Sensor (Minimum, Middle, High) 1→Analogue Level Sensor	1	1
41	Maximum manual values count	1	4
42	AO output type 0→0-20 mA 1→4-20 mA	1	1
43	Backlight illumination	5000	8000

* *Factory Values*

** *Entered value must be set as X10. For example enter 55 for 5,5*

*** *Entered value must be set as /1000. For example enter 10 for 10000.*

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Manual Usage

You may set analogue and digital output values by using Manual. You may move to Manual Screen by pressing MANUAL button on main screen.

Technical Specifications

Operating voltage	220 V AC(+/-%20)
Power consumption	Max 4W
Operating temperature	0~60 °C
Humidity	%10~%85(Non Condensing)
Isolation	2000 V Digital
Keypad	24 keys
Screen	80x50 mm Custom designed LCD
Dimensions	154x104x72 mm

IO List

Digital Outputs(DO)		**Digital Inputs(DI)**	
NO	**Name**	**NO**	**Name**
1	Heating Valve	1	Auto/Manual
2	Cooling Valve	2	Alarm Stop
3	Alarm Output	3	Main Tank Lowest Level (Digital Level)
4	Reel & Main Pump Start	4	Main Tank Low Level (Digital Level)
5	Cold Water Valve	5	Main Tank Middle Level (Digital Level)
6	Main Tank Drain	6	Main Tank High Level (Digital Level)
7	Dosing Valve	7	Additional Tank Low Level (Digital Level)
8	Dosing Pump	8	Additional Tank Middle Level (Digital Level)
9	Overflow valve	9	Additional Tank High Level (Digital Level)
10	Main Tank → Additional Tank Transfer Valve	10	Empty
11	Additional Tank Fill Water Valve	11	Empty
12	Additional Tank Drain Valve	12	Empty
13	Additional Tank Heat Valve	13	Empty
14	Hot Water Valve	14	Empty
15	Empty	15	Empty
16	Empty	16	Empty
Analogue Outputs(AO)		**Analogue Inputs(AI)**	
NO	**Name**	**NO**	**Name**
1	Main Pump Reference Output	1	Main Tank Temperature Input
2	Reel Reference Output	2	Additional Tank Temperature Input
3	Proportional Heating Valve	3	Additional Tank Level Input
4	Proportional Dosing Valve	4	Main Tank Level Input
Counter Inputs(CNT)			
NO	**Name**		
1	Water Counter		

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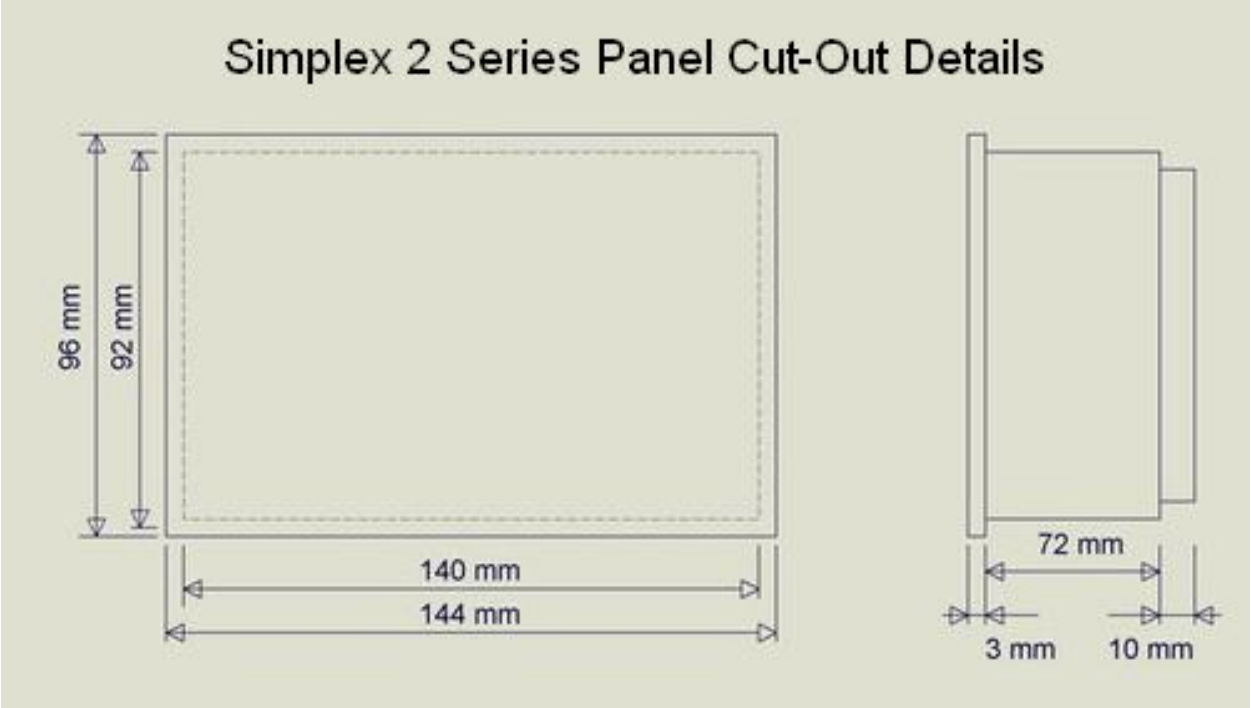
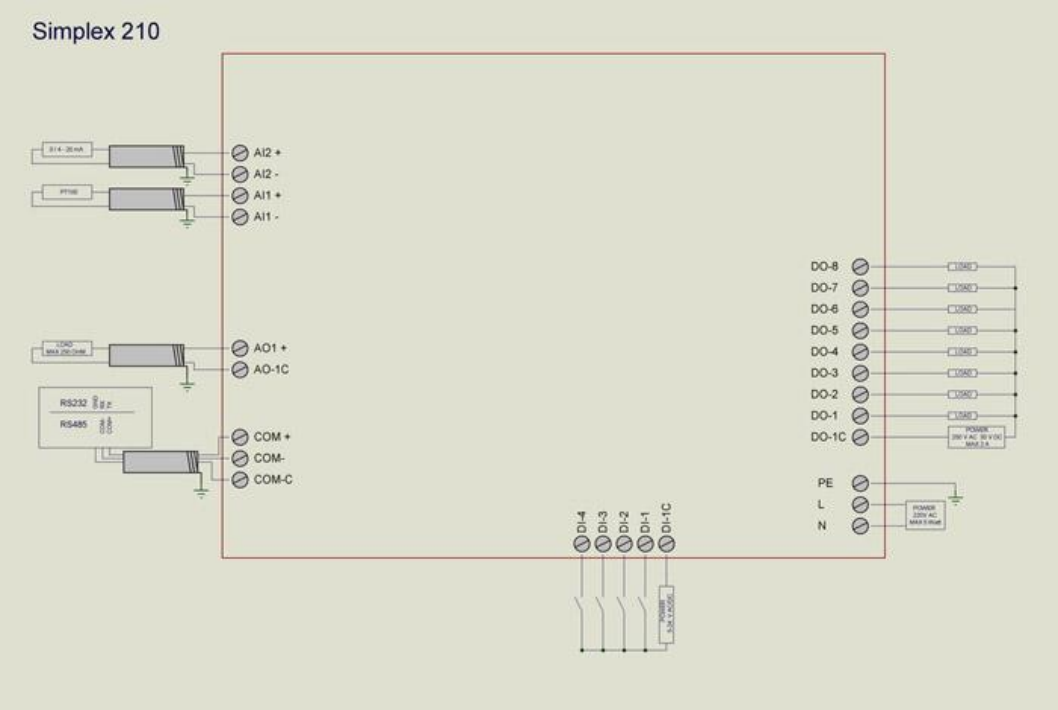
Dimensions and Installation



FIELD CONNECTIONS

210 Series



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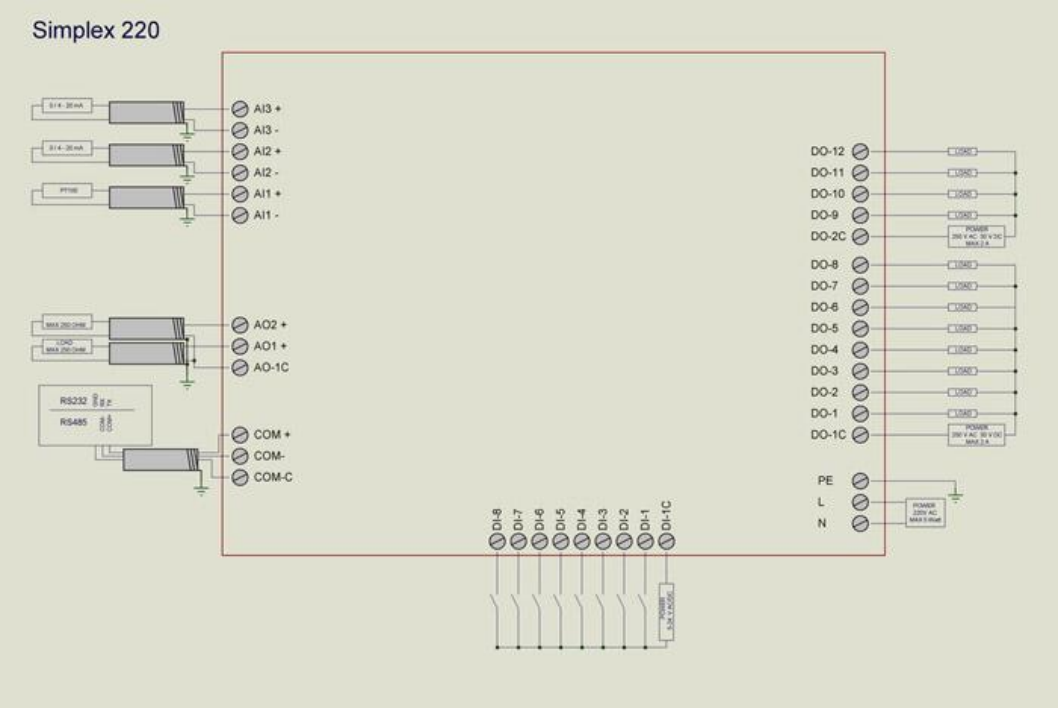
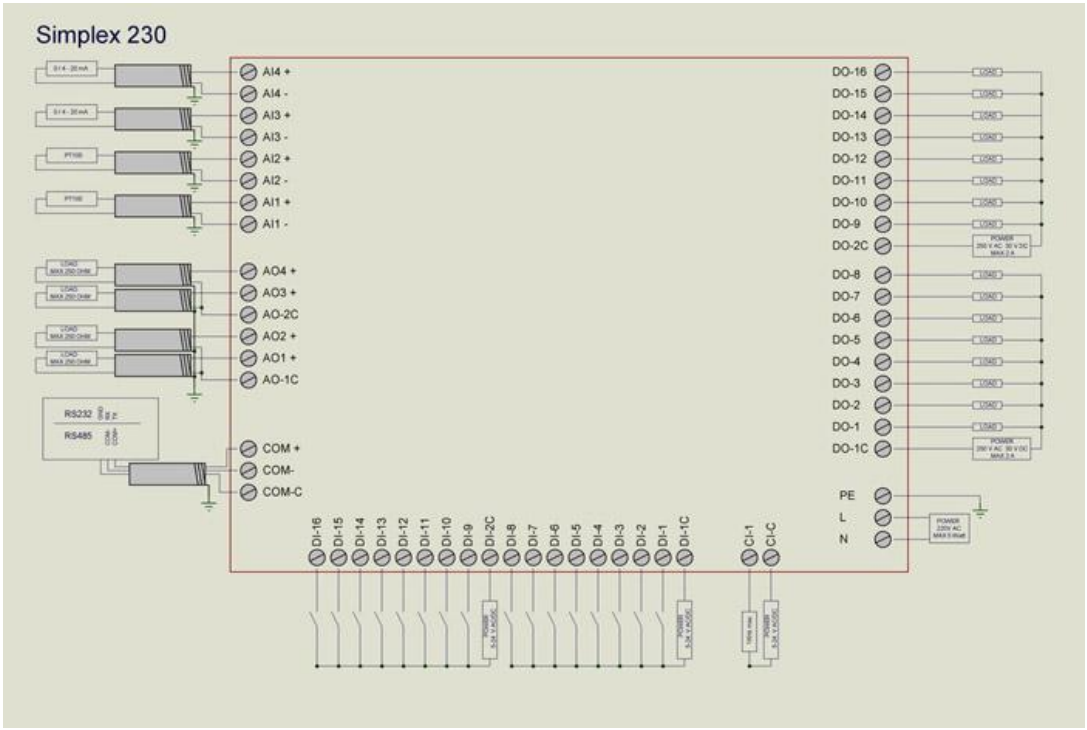
220 Series



230 Series



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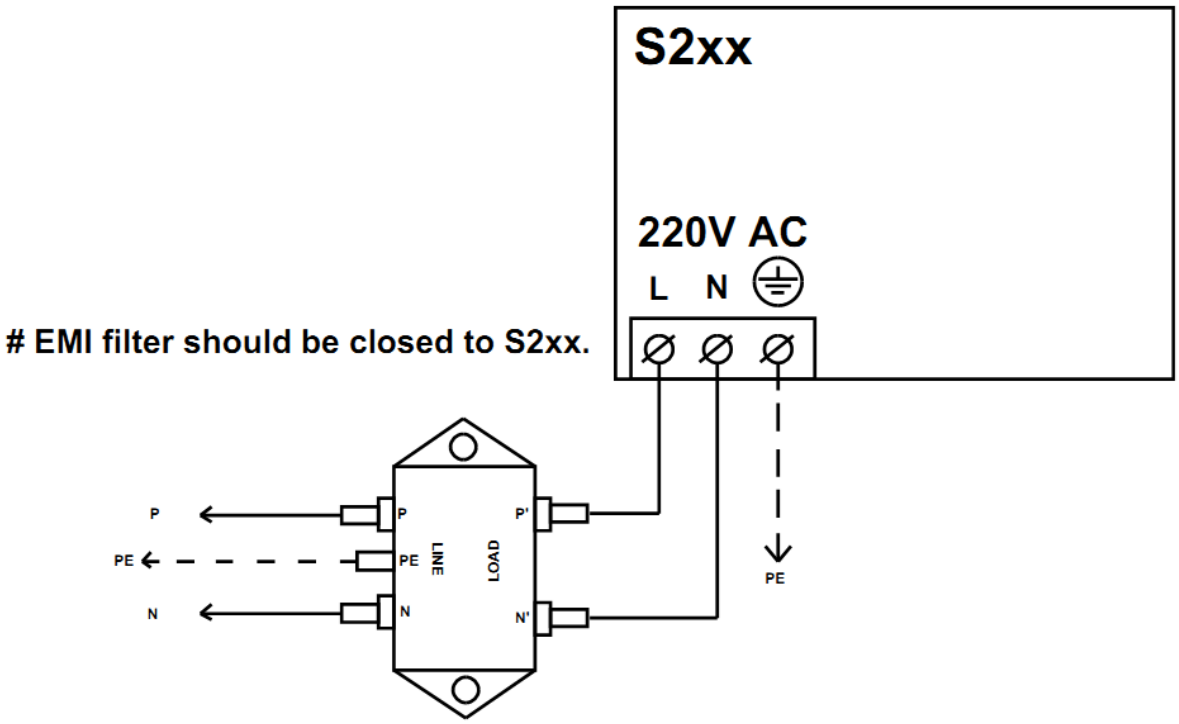
EMI Filter Connection



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